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Measuring Clarity of and Attention to Emotions

Patrick A. Palmieri,[1] M. Tyler Boden,[2] and Howard Berenbaum[2]

[1]*Department of Psychiatry, Summa Health System*
[2]*Department of Psychology, University of Illinois at Urbana-Champaign*

Previous research has found that understanding one's emotions and attending to them are 2 dimensions of emotional awareness. In this research, we examined whether improved subscales for measuring clarity of and attention to emotions could be developed by selecting the best items from 2 frequently used measures of emotional awareness. Using multidimensional scaling and confirmatory factor analysis, we analyzed the Toronto Alexithymia Scale–20 (Bagby, Parker, & Taylor, 1994) and the Trait Meta-Mood Scale (Salovey, Mayer, Goldman, Turvey, & Palfai, 1995) data from 867 college students. Results supported distinct clarity and attention constructs. New subscales were internally consistent and fared as well as or better than previous versions in terms of internal consistency and convergent validity.

Emotions provide individuals with information about their environments and their progress toward goals and thereby influence their judgments, decisions, priorities, and actions (Schwarz, 1990; Schwarz & Clore, 1983). It seems quite likely that the inclination to attend to one's emotions, and the ability to identify one's own emotions, will be important for adaptively using emotional information and will have important implications for individuals' well-being. In fact, a growing body of research has begun to examine links between emotional awareness and different forms of psychopathology (e.g., Berenbaum et al., 2006; Mennin, Holaway, Fresco, Moore, & Heimberg, 2007). It is therefore critical for researchers to determine how to best parse and measure potentially distinct facets of emotional awareness.

Individual differences research on understanding and attending to emotions has proliferated in recent years. Generally, this research has focused on alexithymia and emotional intelligence (e.g., Coffey, Berenbaum, & Kerns, 2003; Davies, Stankov, & Roberts, 1998; Mayer, Caruso, & Salovey, 1999; Mayer & Salovey, 1995; Salovey & Mayer, 1990; Taylor, Bagby, & Parker, 1996; Taylor, Bagby, Ryan, & Parker, 1990). Alexithymia refers to a diminished ability to identify and communicate emotions and an externally oriented cognitive style (Bagby, Taylor, & Parker, 1994; Taylor et al., 1996). It is most often measured with the three subscales of the Toronto Alexithymia Scale–20 (TAS; Bagby, Parker, & Taylor, 1994): Identification of Feelings (TAS–ID), Describing Feelings (TAS–DF), and Externally Oriented Thinking (TAS–EO). Emotional intelligence as typically construed concerns an individual's clarity of emotions, attention to emotions, and ability to regulate emotions (Salovey & Mayer, 1990).[1] It is typically measured by the three subscales of the Trait Meta-Mood Scale (TMMS; Salovey, Mayer, Goldman, Turvey, & Palfai, 1995): Clarity of Emotions (TMMS–Clarity), Attention to Emotions (TMMS–Attention), and Repair/Regulation of Emotions (TMMS–Repair).

In addition to their conceptual overlap, findings from several studies that have used the TAS and TMMS suggest that what they are measuring can be largely described by two distinct underlying dimensions: (a) clarity of one's emotions, and (b) attention to one's emotions. Davies et al. (1998) found that the TMMS–Clarity subscale was more strongly associated with the TAS–ID subscale than it was with the TAS–EO subscale. Gohm and Clore (2000) reported that in a hierarchical cluster analysis, TMMS–Clarity, TAS–ID, and TAS–DF grouped together in one cluster, and TMMS–Attention and TAS–EO grouped together in another cluster. Similar results were obtained in a subsequent study using principal axis factor analysis with an orthogonal rotation (Gohm & Clore, 2002) in which these same sets of subscales loaded on distinct clarity and attention factors. Likewise, Coffey et al. (2003), who used principal components factor analysis (with orthogonal and oblique rotations), found that TMMS–Clarity, TAS–ID, and TAS–DF loaded on the same factor, whereas TMMS–Attention and TAS–EO loaded on a separate factor. Moreover, the clarity and attention factor scores exhibited a distinct pattern of correlations with personality variables (neuroticism and extraversion) and with attention to emotional information as measured with an emotional Stroop task.

A shortcoming of these multiinstrument cluster and factor analyses of clarity of emotions and attention to emotions is that they were based on subscale scores rather than individual items. Consequently, it is possible that (a) attention to emotion and clarity of emotion are not really as distinct as the analyses based on subscale scores suggest, and (b) some of the items included in the subscales are not particularly good indicators of the construct they are intended to measure. There is at least some evidence that using subscale scores rather than individual items introduces noise into the measurement of these constructs. Although Coffey et al.'s (2003) two-factor solution revealed that (a) TAS–ID, TAS–DF, and TMMS–Clarity loaded high on the clarity factor (.86, .87, and .66, respectively) and low on the attention factor (.03, –.08, and .31, respectively); and (b) TMMS–Attention and TAS–EO loaded high on the attention factor (.73 and –.66, respectively) and low on the clarity

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Address correspondence to Patrick A. Palmieri, Center for the Treatment and Study of Traumatic Stress, St. Thomas Hospital, 4th Floor, Ambulatory Care Building, 444 North Main Street, Akron, OH 44310; Email: palmierp@summahealth.org

[1]We note that both self-report scales and performance-based measures are used to assess emotional intelligence (e.g., Brackett & Mayer, 2003; Dizen, Berenbaum, & Kerns, 2005; Gohm & Clore, 2002; Salovey, Mayer, Caruso, & Lopes, 2003). The former typically measure the understanding of one's own emotions, which is the focus of this article, whereas the latter typically measure one's understanding of other people's emotions.

factor (–.03, and .37, respectively); other research with additional extracted factors have rendered less clear pictures. In addition to clarity and attention, Gohm and Clore (2002) extracted two other factors interpreted as intensity of emotion and expression of emotion. Although the TMMS–Clarity, TAS–ID, and TAS–DF subscales loaded high on the clarity factor (.79, –.84, and –.67, respectively) and low on the attention factor (.16, .06, and –.21, respectively), the TAS–DF subscale also loaded substantially on the emotion expression factor (–.41). Similarly, although the TMMS–Attention and TAS–EO subscales loaded high on the attention factor (.57 and –.72, respectively) and low on the clarity factor (.15 and –.22, respectively), the TMMS–Attention subscale also loaded substantially on the expression factor (.46). Thus, the collective set of TAS–DF items is not a clean indicator of clarity of emotion, whereas the collective set of TMMS–Attention items is not a clean indicator of attention to emotion. Furthermore, by focusing on subscale indicators, potentially poor functioning items (from any subscale) cannot be identified. Similarly, some potentially good items may be overlooked because they belong to subscales that include many poor items.

In this research, we examined whether attention to emotion and clarity of emotion are truly distinct and explored the possibility of developing improved subscales for measuring individual differences in clarity of and attention to emotions by combining items from two different instruments and by excluding items that do not clearly tap one construct as opposed to the other. Although there are a number of instruments that measure emotional awareness, we focused on two of the most frequently used instruments, the TAS and the TMMS.[2] Although each has its strengths, such as validity data available from several populations, it is not always feasible to administer both measures. For example, reduction of items often is necessary in contexts in which many constructs need to be assessed in relatively brief periods of time. Thus, in this study, we focused on the item level to identify the best TAS and TMMS indicators of the clarity and attention constructs.

We analyzed TAS and TMMS data from college student samples using multidimensional scaling (MDS) and confirmatory factor analysis (CFA). MDS emphasizes naturally occurring relationships among items without imposing a simple or linear structure as often occurs with factor analysis (Davison, 1983; MacCallum, 1974). In this manner, MDS is a more general analysis that relies less on preconceived assumptions about the structure of the data (Guttman, 1955; Turkheimer, Ford, & Oltmanns, 2008). MDS is a statistical method that represents measurements of similarity (or dissimilarity) as distances among points in a multidimensional geometric space (Borg & Groenen, 1997). In other words, the distances between the points directly correspond to the magnitude of the similarity measures so that the closer two points are located in geometric space the greater the similarity between them and vice versa. This allows us to "view" the structure of the data and to determine subtleties in form and grouping of items. By visually inspecting the MDS output, or common space, we can determine which items most cohesively group together in a region and which items might not group together as well with that region because of their relative dispersion and possible overlap with items from another domain. As pointed out by Turkheimer et al. (2008), MDS is good for understanding the structure of data, whereas factor analysis is good for reproducing data. As such, MDS can be used effectively as a complement to CFA by ascertaining structure that then can be tested with CFA (e.g., Aarons, Goldman, Greenbaum, & Coovert, 2003).

Following the recommendation of McCrae (2000), we explored the validity of the clarity and attention scales developed through the MDS and CFA analyses by examining their associations with the personality facet openness to experience. Because individuals with higher openness to experience should also be more open to their own emotional experiences and therefore be expected to have more emotional awareness, higher levels of openness to experience should be associated with greater attention to their own emotions and clarity of emotions. In addition, given that clarity of and attention to emotions are theoretically independent facets of emotional awareness, each scale should be associated with openness to experience when taking the other into account.

Method

Participants

Out of 887 participants sampled for this study, 20 (2.3%) were dropped from all analyses due to incomplete data. The overall sample for this study included 867 college students (447 [51.6%] female, 413 [47.6%] male, 7 missing) who received course credit for participation. The average age was 19.1 years ($SD = 1.8$). The racial composition of the sample was primarily White (66.2%), followed by Asian American (6.0%), African American (5.5%), Latino/Hispanic (2.5%), other (2.5%), multiracial (0.8%), and Native American (0.5%). Information about race was unavailable for 15.9% of the sample.

Measures

We assessed clarity of emotions with the seven items from the TAS–ID subscale (Bagby, Parker, et al., 1994; e.g., "I have feelings that I can't quite identify") and the 11 items from the TMMS–Clarity subscale (Salovey et al., 1995; e.g., "I am usually confused about how I feel"). Respondents rated how much they agreed with each item on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). We keyed item responses so that higher scores indicated higher levels of clarity. These subscales are reported to have adequate psychometric properties (e.g., TAS–ID $\alpha = .78$ [Bagby, Parker, et al., 1994]; TMMS–Clarity $\alpha = .88$ [Salovey et al., 1995]). Clarity of emotions has been associated with a variety of psychological phenomena such as childhood abuse and personality disturbance (Berenbaum, 1996), history of depressive disorder (Ehring, Fischer, Schnulle, Bosterling, & Tuschen-Caffier, 2008), and self-focused needs (Dizen et al., 2005). Although the TAS–ID and TAS–DF subscales are positively correlated and tend to load on a common identification factor in factor and cluster analyses of subscale scores, we chose not to include TAS–DF items in

[2] PsycINFO keyword searches yielded 668 hits for "Toronto Alexithymia Scale," 44 hits for "Trait Meta Mood Scale," 5 hits for the "Mood Awareness Scale" (MAS; Swinkels & Giuliano, 1995), and 3 hits for the "Difficulties in Emotion Regulation Scale" (DERS; Gratz & Roemer, 2004). Searches of the Social Sciences Citation Index yielded 491 citations for the first TAS paper (Bagby, Parker, et al., 1994); 369 for the second one, which was published simultaneously with the first (Bagby, Taylor, et al., 1994); 182 for the TMMS; 44 for the MAS; and 13 for the DERS.

our analyses because (a) the abilities to identify and communicate emotions are conceptually distinct; and (b) past research has found that, as we would expect, the abilities to identify and communicate emotions have different correlates (e.g., Berenbaum, 1996; Le, Berenbaum, & Raghavan, 2002).

We assessed attention to emotions with the eight items from the TAS–EO subscale (Bagby, Parker, et al., 1994; e.g., "Being in touch with emotions is essential") and the 13 items from the TMMS–Attention subscale (Salovey et al., 1995; e.g., "I don't pay much attention to my feelings"). Respondents rated how much they agreed with each item on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). We keyed item responses so that higher scores indicated higher levels of attention to emotion. The TMMS–Attention subscale has been reported to have adequate psychometric properties (e.g., $\alpha = .86$ [Salovey et al., 1995]), although the evidence is less clear for the TAS–EO subscale (e.g., $\alpha = .66$ [Bagby, Parker, et al., 1994]). Attention to emotions has been associated with a variety of psychological phenomena such as cognitive-perceptual disturbances (Berenbaum et al., 2006), social support coping (Gohm & Clore, 2002), and the degree to which individuals perceive their psychological needs to be implicated (Dizen et al., 2005).

We assessed openness to experience in a subsample of 328 participants with the 10-item version of the Openness to Experience (intellect/imagination) subscale from the International Personality Item Pool (Goldberg, 1999). Respondents rated how much they agreed with each item (e.g., "I have a vivid imagination") on a 5-point Likert-type scale ranging from 1 (*very inaccurate*) to 5 (*very accurate*). We keyed item responses so that higher scores indicated higher levels of openness to experience. The scale had good internal consistency ($\alpha = .79$; average interitem correlation = .27) and has been found to have good internal consistency (e.g., $\alpha = .84$) and reasonable evidence of convergent and discriminant validity in previous studies (Goldberg, 1999; Lim & Ployhart, 2006).

Procedure

All of the students included in this study provided informed consent prior to participation and were participating in one of several research projects in our laboratory. Some participants were tested individually, whereas others were tested in groups of 10 or fewer. All questionnaires were completed in a single study session. The order of questionnaire administration varied across the studies included in this report; and in some cases, the TAS and TMMS items were intermixed.

Data Analyses

The sample of 867 cases was split randomly into four subsamples: A ($n = 100$) was used for an initial MDS analysis, B ($n = 100$) was used for a follow-up MDS analysis, C ($n = 334$) was used for an initial CFA, and D ($n = 333$) was used for a revised CFA.

Our goals for the MDS analyses were twofold. First, without imposing a simple or linear structure, we set out to determine whether TAS and TMMS items grouped together in the hypothesized domains of clarity of and attention to emotions. Second, we wanted to identify items that do not well represent the domains of clarity of and attention to emotions. The degree to which these items represent these domains could then be formally tested using CFA. We conducted a set of MDS analyses, which we interpreted according to facet theory (Borg & Shye, 1995; Guttman, 1959; Guttman & Levy, 1991) to achieve the first goal. Facet theory provides a systematic means by which to determine if the grouping of items in MDS space corresponds with theoretically established groups through regional interpretation. Items hypothesized to be representative of clarity of emotions, and those hypothesized to be representative of attention to emotions, grouping together in particular distinguishable regions of MDS space, would support the notion that clarity of and attention to emotions are distinct domains of the facet of emotional awareness. Facet diagrams help to partition the emotional awareness facet into clarity of and attention to emotions domains by respectively labeling these items to determine their typology as represented in MDS space and to distinguish them through the use of a partitioning line (Borg & Groenen, 1997). The smoother and simpler the partitioning line and the more clarity of and attention to emotions items the partitioning line correctly classifies into their respective and unambiguously distinguished domains, the greater the likelihood that these domains are replicable across multiple MDS solutions (Borg & Groenen, 1997). In this set of MDS analyses, we investigated whether all items hypothesized to measure clarity of and attention to emotion from the TAS and TMMS indeed group into domains distinguished by a smooth and simple partitioning line. To achieve our second goal, we examined the output of our MDS analyses to identify items that tended not to cohesively cluster with other items (Borg & Groenen, 1997).

We conducted our first MDS analysis using subsample A and then replicated the analysis using subsample B. Similarity between the initial analysis and its replication in terms of the structure obtained by MDS serves as evidence for the generalizability of these findings and increases confidence in our interpretation of that structure. We note that replication in MDS does not mean that the mirror MDS solutions in subsamples A and B would completely match, point by point (Borg & Groenen, 1997). Replication merely means that the mirror solutions can be partitioned in similar ways such that regions and clusters of items are essentially identifiable across both solutions (Borg & Groenen, 1997).

We conducted MDS analyses on dissimilarity matrices composed of transformed Guttman monotonicity coefficients (Guttman, 1981, 1986) (i.e., $1 - \mu 2$) for all possible pairs of the included emotional awareness items. In contrast with Pearson correlation coefficients, Guttman monotonicity coefficients do not rely on assumptions of linearity (Guttman, 1981, 1986). Given that we could not be sure of the linearity of the data, we elected to use Guttman monotonicity coefficients. We used Euclidean metric multidimensional scaling (see Davison, 1983; Kruskal & Wish, 1978) implemented by PROXSCAL (Commandeur & Heiser, 1993) to generate a geometric representation of the correlation matrices, which we interpreted in regard to structure and dimensionality. We implemented 100 random starts with 100 iterations in an effort to avoid local minima and degenerate solutions.

To reduce stress, or badness of fit, the majorization algorithm implemented by PROXSCAL was used (Commandeur & Heiser, 1993). We calculated normalized raw stress (i.e., the square root of a normalized residual sum of squares; Kruskal & Wish, 1991) to determine badness of fit or the extent to which the distances provided by the MDS solution corresponded with the proximities. We tried to balance interpretability and goodness of fit when determining how many dimensions best fit the data. Because the goals of this study were to investigate how items group together into regions, and to avoid the potential reification of arbitrary interpretations by the reader (Borg & Groenen, 1997; Turkheimer et al., 2008), we did not concern ourselves with the psychological explanation of the dimensions that explain the data.

The full item covariance matrix for subsample C was submitted to LISREL 8.71 (Jöreskog & Sörbom, 1996) to test the proposed two-factor model (clarity of emotions: 18 indicators; attention to emotions: 21 indicators) using CFA with robust maximum likelihood estimation. Each item was specified to load on only one factor, error covariances were constrained to zero, and the two factors were allowed to correlate. As is customary, we used multiple indexes to evaluate model-data fit, including Satorra–Bentler (S–B) chi-square (Satorra & Bentler, 1988), root mean square error of approximation (RMSEA; Steiger, 1990), standardized root mean square residual (SRMR; Bentler, 1990), and comparative fit index (CFI; Bentler, 1990). A variety of cutoff scores for these indexes have been suggested for evaluating model fit (e.g., Hu & Bentler, 1999; Kline, 2005). They should be viewed as guidelines and not applied rigidly, as their performance depends on a variety of factors (e.g., sample size, parameter estimation method, model misspecification, distribution of the data). We considered commonly used cutoffs of RMSEA < .08, SRMR < .08, and CFI > .90 to be indicative of adequate model fit.

We independently reviewed the MDS and CFA results for subsamples A, B, and C to determine which items to retain. Because there are not well established decision rules for determining which items to include/exclude on the basis of MDS and CFA results, any explicit decision rules we could have generated would have been somewhat arbitrary. We therefore chose to have each of us independently judge which items seemed to be reasonable exemplars of the constructs based on the MDS facet diagrams and factor loadings of the initial CFA. This enabled us to examine interrater reliability and to use the majority opinion to make our decisions. We measured interrater agreement with the kappa statistic (κ). We retained items that were deemed worthy by at least two of us and subjected them to a final CFA for subsample D that was evaluated using the same criteria mentioned previously. We then calculated descriptive statistics for the final scales, compared them to previous versions, and examined their associations with openness to experience.

RESULTS

Initial and Secondary MDS Analyses (Subsamples A & B)

Scree plots showed that two (stress samples A and B = .08) or three (stress samples A and B = .04) dimensions adequately represented both models and that scaling in four, five, and six dimensions likely was capturing random noise or error variance (Borg & Groenen, 1997). Although scaling in three dimensions provided a significant increase in the goodness of fit, the third dimension did not facilitate interpretation of the solutions, and therefore, we chose to retain the two-dimensional solutions.

The common spaces for the MDS analyses are depicted in Figure 1. Visual inspection of this two-paneled graph revealed that emotional awareness items clearly grouped together into the domains of clarity of and attention to emotions for both samples A and B. In accordance with facet theory, we drew a partitioning line that distinguishes these two domains. It is apparent that all the TAS–ID and TMMS–Clarity items grouped together to form a clarity of emotions domain, and all the TAS–EO and TMMS–Attention items grouped together to form an attention to emotions domain. Because the line (a) was smooth, (b) correctly classified all clarity and attention items into their hypothesized domains, and (c) unambiguously distinguished the domains in each sample, we are confident that these results captured the true structure of emotional awareness items.

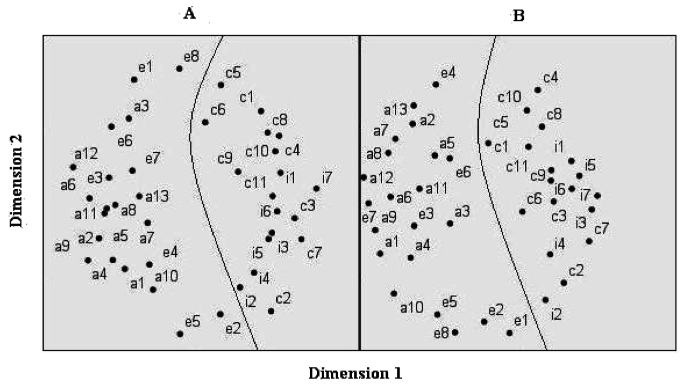

FIGURE 1.—Facet diagram depicting emotional awareness items from the Toronto Alexithymia Scale (TAS) and the Trait Meta-Mood Scale (TMMS), with a partitioning line clearly distinguishing clarity of (i.e., "c" [TMMS–Clarity], "i" [TAS–ID]) and attention to (i.e., "a" [TMMS–Attention], "e" [TAS–EO]) emotions items for subsamples A and B.

Our second goal was to identify items that do not cluster closely with other items in a particular domain. What is noticeable in Figure 1 is that some items clustered together to form the clarity of and attention to emotions domains more readily than others. In other words, there seems to be a core group of clarity and identification items that closely clustered together in a particular region of the MDS solution space to form the clarity of emotions domain, whereas some other identification and clarity items were located more peripherally to these clusters. The same was true for the attention and externally oriented thinking items and the attention to emotions domain. In solutions for both subsamples, it can be seen that clarity items i2, i4, and c2 lie more peripherally to a cluster composed of the remaining identification and clarity items. Attention items e1, e2, e5, and e8 lie more peripherally to a cluster composed of the remaining attention and externally oriented thinking items.

Initial CFA (Subsample C)

The S–B chi-square for the hypothesized two-factor model was significant, $\chi^2(701, N = 334) = 1597.73$, indicating a lack of model-data fit. Given its sensitivity to sample size, this was not unexpected. According to the other fit indexes collectively, however, the model adequately fit the data (RMSEA = .062; 95% confidence interval [CI] = .058–.066; SRMR = .075; CFI = .92). The fitted residuals were acceptably small, ranging from –0.25 to 0.38, with a median value of 0.00. Standardized residuals ranged from –4.63 to 5.76, with relatively few (7.9%) having an absolute value greater than 3.0. With one exception (Item e1),

TABLE 1.—Standardized factor loadings for the initial CFA (subsample C, $n = 334$) and revised CFA (subsample D, $n = 333$).

	Subsample C Factors		Subsample D Factors	
Item Label (Original TAS/TMMS Item Number) and Item Content	Clarity	Attention	Clarity	Attention
TAS–Identifying Feelings				
I1 (1) I am often confused about what emotion I am feeling.	.70		.74	
I2 (3) I have physical sensations that even doctors don't understand.	.34			
I3 (6) When I am upset, I don't know if I am sad, frightened, or angry.	.59		.55	
I4 (7) I am often puzzled by sensations in my body.	.45			
I5 (9) I have feelings that I can't quite identify.	.66		.67	
I6 (13) I don't know what's going on inside me.	.70		.68	
I7 (14) I often don't know why I am angry.	.57		.43	
TMMS–Clarity				
C1 (29) I usually know my feelings about a matter.	.57		.58	
C2 (4) My beliefs and opinions always seem to change depending on how I feel.	.32			
C3 (5) I can't make sense out of my feelings.	.66		.69	
C4 (6) I am rarely confused about how I feel.	.61		.56	
C5 (9) I am often aware of my feelings on a matter.	.47			
C6 (12) I feel at ease about my emotions.	.58			
C7 (17) I am often puzzled by sensations in my body.	.62		.54	
C8 (21) I am usually clear about my feelings.	.59		.57	
C9 (22) I can never tell how I feel.	.60		.63	
C10 (25) I almost always know exactly how I am feeling.	.61		.61	
C11 (28) I am usually confused about how I feel.	.74		.77	
TAS–Externally Oriented Thinking				
E1 (5) I prefer to analyze problems rather than just describe them.		.09		
E2 (8) I prefer to just let things happen rather than to understand why they turned out that way.		.17		
E3 (10) Being in touch with emotions is essential.		.73		.66
E4 (15) I prefer talking to people about their daily activities rather than their feelings.		.42		
E5 (16) I prefer to match "Light" entertainment shows rather than psychological dramas.		.15		
E6 (18) I can feel close to someone, even in moments of silence.		.38		
E7 (19) I find examination of my feelings useful in solving personal problems.		.61		.60
E8 (20) Looking for hidden meanings in movies or plays distracts from their enjoyment.		.24		
TMMS–Attention				
A1 (1) I believe in acting from the heart.		.53		
A2 (2) I never give in to my emotions.		.54		.49
A3 (27) Feelings are a weakness humans have.		.53		
A4 (3) Feelings give direction to life.		.47		
A5 (30) I don't pay much attention to my feelings.		.74		.71
A6 (8) I don't think it's worth paying attention to our emotions or moods.		.58		.64
A7 (11) I often think about my feelings.		.59		.64
A8 (13) I don't usually care much about what I'm feeling.		.71		.69
A9 (15) One should never be guided by emotions.		.50		
A10 (18) The best way for me to handle my feelings is to experience them to the fullest.		.51		
A11 (19) It is usually a waste of time to think about your emotions.		.68		.64
A12 (24) People would be better off if they felt less and thought more.		.55		.51
A13 (26) I pay a lot of attention to how I feel.		.71		.70

Note. CFA = confirmatory factor analysis; TAS = Toronto Alexithymia Scale–20; TMMS = Trait Meta-Mood Scale. All items were keyed so that higher item responses indicated higher levels of clarity or attention. Items from the TAS are from "The twenty-item Toronto Alexithymia Scale: I. Item selection and cross-validation of the factor structure," by R. M. Bagby, J. D. A. Parker, and G. J. Taylor, 1994, *Journal of Psychosomatic Research, 38,* pp. 23–32. Items from the TMMS are from *Emotion, Disclosure, & Health* (pp. 125–154) by J. Pennebaker (Ed.), 1995, Washington, DC: American Psychological Association. Reprinted with permission.

each item loaded significantly on its respective factor. Loadings for the clarity factor ranged from .32 to .74 and averaged .58; loadings for the attention factor ranged from .09 to .74 and averaged .50 (see Table 1). The factor correlation coefficient was .21.

Final Item Selection

Based on the MDS and CFA results for subsamples A, B, and C, our judgments for final item retention were very consistent ($\kappa = .89$ for P. A. Palmieri and H. Berenbaum [agreed on 37 of 39 items], $\kappa = .84$ for P. A. Palmieri and M. T. Boden [36/39], $\kappa = .73$ for M. T. Boden and H. Berenbaum [34/39]). There was unanimous agreement to retain 5 of the 7 TAS–ID items (i1, i3, i5, i6, i7) and 8 of the 11 TMMS–Clarity items (c1, c3, c4, c7, c8, c9, c10, c11) as indicators of the clarity factor and 2 of the 7 TAS–EO items (e3, e7) and 6 of the 13 TMMS–Attention items (a5, a6, a7, a8, a11, a13) as indicators of the attention factor. Two of the remaining TMMS–Attention items (a2, a12) were judged to be adequate by two of us. Thus, the final item set included 13 clarity items and 10 attention items.

Final CFA (Subsample D)

The two-factor CFA based on the final 23 items yielded a significant S–B chi-square, $\chi^2(229, N = 333) = 570.47$, but the other indexes suggested adequate fit (RMSEA = .067; 95% CI = .060–.074; SRMR = .075; CFI = .94). The fitted residuals were acceptably small, ranging from –0.23 to 0.21, with a median value of 0.00. Standardized residuals ranged from –4.28 to 4.66, with only 7.6% greater than an absolute value of 3.0. Each item loaded significantly on its respective factor. Loadings for the

TABLE 2.—Internal consistency estimates and Pearson correlation coefficients for clarity of emotions and attention to emotions scales.

Scale	No. Items	α	r_{ii}	1	2	3	4	5	6	7
1. Clarity (final)	13	.89	.41							
2. Clarity (TAS–ID and TMMS–Clarity)	18	.89	.32	.97						
3. Clarity (TAS–ID)	7	.82	.39	.80	.87					
4. Clarity (TMMS–Clarity)	11	.85	.34	.94	.94	.65				
5. Attention (final)	10	.87	.40	.12	.13	.05	.18			
6. Attention (TAS–EO and TMMS–Attention)	21	.86	.23	.14	.15	.07	.19	.94		
7. Attention (TAS–EO)	8	.66	.20	.11	.12	.07	.13	.61	.78	
8. Attention (TMMS–Attention)	13	.87	.34	.13	.14	.06	.18	.94	.93	.49

Note. α = Cronbach's alpha; r_{ii} = average interitem correlation; TAS = Toronto Alexithymia Scale–20; TAS–ID = Identification of Feelings subscale of the TAS; TMMS = Trait Meta-Mood Scale; TAS–EO = Externally Oriented Thinking subscale of the TAS. All correlation coefficients are statistically significant ($p < .01$) except for the four coefficients $\leq$.07 in column 3.

clarity factor ranged from .43 to .77 and averaged .62; loadings for the attention factor ranged from .49 to .71 and averaged .63 (see Table 1). The factor correlation coefficient was .12.

New Scale Descriptives and Comparisons to Previous Scales

We calculated clarity and attention scale scores based on the final item set by averaging relevant item responses for the full sample ($N = 867$). The 13-item clarity scale exhibited sufficient internal consistency ($\alpha = .89$) and had a mean of 3.6 ($SD = 0.7$). The 10-item attention scale also was internally consistent ($\alpha = .87$) with a mean of 4.0 ($SD = 0.6$). As shown in Table 2, internal consistency estimates for these two scales were as high as or higher than those for scales derived from other combinations of TAS and TMMS items, including those scales with more items. This is impressive given that internal consistency estimates tend to increase as the number of items included in a scale increases. Stated another way, the average interitem correlations, which in a sense controls for number of items, were larger for the new scales than for their respective previous versions.

The new Clarity and Attention scales correlated at .12 ($p < .01$). Comparing correlated but nonoverlapping correlations (see Raghunathan, Rosenthal, & Rubin, 1996), these scales correlated to a significantly lesser extent than did (a) the clarity and attention scales formed from all pertinent TAS and TMMS items ($z = 2.12$, $p < .05$, two-tailed) and (b) the Clarity and Attention subscales of the TMMS ($z = 3.68$, $p < .01$, two-tailed). The new clarity and attention scales were not less strongly correlated than were the corresponding scales from the TAS. This was not surprising because the correlation between the two TAS subscales was so low. In all likelihood, this reflects the fact that the TAS–EO subscale was not designed to measure attention to emotions (although it includes a couple of excellent indicators of attention to emotion and is moderately correlated with other attention to emotions subscales); it is probably because the TAS–EO subscale is more than just a measure of attention to emotions that it is not correlated with clarity of emotions.

TABLE 3.—Correlations and partial correlations between openness to experience and clarity and attention scales.

Scale	Zero Order Correlations With Openness to Experience	Partial Correlations With Openness to Experience
Clarity (final)	.29**	.25**[a]
Attention (Final)	.23**	.18**[b]
Clarity (TAS–ID)	.19**	.13*[c]
Attention (TAS–EO)	.36**	.34**[d]
Clarity (TMMS–Clarity)	.33**	.29**[e]
Attention (TMMS–Attention)	.19**	.11[f]

Note. TAS = Toronto Alexithymia Scale–20; TAS–ID = Identification of Feelings subscale of the TAS; TAS–EO = Externally Oriented Thinking subscale of the TAS; TMMS = Trait Meta-Mood Scale.
[a]Shared variance with Attention (final) scale removed.
[b]Shared variance with Clarity (final) scale removed.
[c]Shared variance with Attention (TAS–EO) scale removed.
[d]Shared variance with Clarity (TAS–ID) scale removed.
[e]Shared variance with Attention (TMMS–Attention) scale removed.
[f]Shared variance with Clarity (TMMS–Clarity) scale removed.
$^{*}p < .05$. $^{**}p < .01$.

Associations With Openness to Experience

As shown in Table 3, the new clarity and attention scales were both significantly correlated with openness to experience. Furthermore, even after taking into account shared variance with each other, the new clarity and attention scales were both clearly independently associated with openness to experience. These results contrast slightly with those obtained when analyses were repeated using the TMMS–Clarity and TMMS–Attention scales. Although the TMMS–Clarity scale is clearly associated with openness to experience, the association between the TMMS–Attention scale and openness to experience fell short of significance when taking clarity into account. The results using the new clarity and attention scales also contrast with those obtained when analyses were repeated using the TAS clarity and attention scales. As with the TMMS, the two TAS scales were associated very differently with openness to experience; the TAS–EO (attention) scale was much more strongly associated with openness to experience than was the TAS clarity scale, and the correlation between the TAS clarity scale and openness to experience was barely significant when taking the TAS attention scale into account.

DISCUSSION

The aim of this study was to identify a subset of TAS and TMMS items that functioned well as indicators of clarity of emotions and attention to emotions.[3] MDS and CFA results yielded 13 clarity items (5 from the TAS, 8 from the TMMS) and 10 attention items (2 from the TAS, 8 from the TMMS). The clarity

[3]Although we are recommending subsets of items from the TAS and TMMS for researchers who wish to measure attention to and/or clarity of emotion, we also recommend that if a researcher wishes to measure alexithymia, that they use the full original TAS–20.

of emotions and attention to emotions constructs were distinct, as were the new scales derived from their respective indicators. These scales also were internally consistent as determined by Cronbach's coefficient alpha and average interitem correlation. Furthermore, the new scales fared as well as or better than previous versions in terms of internal consistency and convergent validity. For example, as predicted, the new clarity and attention scales were both significantly associated with openness to experience even when taking into account shared variance with each other. The new scales also require less administration time (23 items instead of 50 for the full TAS and TMMS and instead of 39 for the full TAS–ID, TAS–EO, TMMS–Clarity, and TMMS–Attention), which in future research can afford assessment of additional constructs without increasing subject burden.

Even though we parsed emotional awareness into two constituent parts, clarity and attention, we think it is possible that emotional awareness may turn out to be better conceptualized as including a larger number of facets. In particular, as has been suggested by some researchers (e.g., Baker, Thomas, Thomas, & Owens, 2007), we think an important aspect of emotional awareness that is not captured by either the TAS or TMMS is understanding the source of one's emotions. In other words, just as individuals vary in knowing what they are feeling (e.g., I am feeling angry vs. sad), it also is likely that they vary in knowing why they are feeling what they are feeling (e.g., I am feeling sad because my boss was intentionally mean to me vs. I am feeling sad because I was turned down for a date). Thus, it may prove to be the case that attention to emotions may be parsed into attention to what one feels and attention to why one is feeling what one is feeling.

A strength of this study is the use of multiple analytic approaches that do not make the same assumptions about the data. Unlike factor analysis, MDS reveals underlying structure without imposing a simple or linear structure. As MDS is a descriptive procedure, though, it is complemented well by methods such as CFA. Another strength of the study, made possible by the large overall sample size, is the use of independent subsamples for MDS and CFA analyses.

Several factors are important to consider when interpreting this study and planning future research to build on it. First, although our sample contained levels of attention to and clarity of emotions that were similar to those found in some nonstudent community samples (e.g., Palmer, Donaldson, and Stough, 2002), it is not known to what extent our overall findings apply to populations with different characteristics than those of this sample. Second, although the TAS and TMMS are among the most commonly used measures of clarity of emotions and attention to emotions, by focusing only on these two instruments, it is likely that we have excluded some useful indicators from other instruments. Perhaps by including other items we could further refine the clarity and attention constructs. Third, it will be important for future research to examine the relationships between the new scales in this study and a variety of external variables hypothesized to be differentially associated with the new scales. For example, including behavioral performance-based measures of emotional awareness as external criteria would help establish the validity of the constructs and the new scales based on them.

In this study, we did not directly address the question of whether attention to and clarity of emotions are best conceptualized as traits, and therefore measured as such, or as skills, and should therefore be assessed using performance-based measures. Our own view is that the degree to which individuals attend to their own emotions is a disposition rather than a skill, just as is the degree to which individuals attend to their heart rate or to other proprioceptive stimuli. We do believe that knowing what one is feeling is a skill, albeit one that cannot be easily tested (unlike the ability to know what others are feeling), because the correct answer (what emotion the person really is experiencing) is not known to whomever might do the testing. Given this limitation of the testing of clarity of one's own emotions, we believe the scale we describe in this article provides a reasonable, if imperfect, measure of this ability. We are optimistic that continued research on emotional awareness and its measurement will prove to be beneficial for our understanding of emotional processes, individual differences, and psychopathology (e.g., Berenbaum, Raghavan, Le, Vernon, & Gomez, 2003; Gohm & Clore, 2002).

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Patrick A. Palmieri is at the Center for the Treatment and Study of Traumatic Stress and Department of Psychiatry, St. Thomas Hospital, Summa Health System, Akron, Ohio; M. Tyler Boden was at the Department of Psychology, University of Illinois at Urbana-Champaign; Howard Berenbaum is at the Department of Psychology, University of Illinois at Urbana-Champaign. M. Tyler Boden is currently affiliated with the Departments of Psychiatry & Behavioral Sciences and Psychology at Stanford University.

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